INDOOR AIR QUALITY ASSESSMENT

Department of Revenue
100 Cambridge Street
Boston, MA

Prepared by:
Massachusetts Department of Public Health
Bureau of Environmental Health
Indoor Air Quality Program
January 2017

Background

Building:	Department of Revenue (DOR)
Address:	100 Cambridge Street, Boston, MA
Assessment Requested by:	Joshua Martin, Deputy Director, Office of Facilities Management, Massachusetts DOR
Reason for Request:	Lease renewal indoor air quality (IAQ) status report
Date of Assessment:	January 11, 2017
Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:	Ruth Alfasso, Environmental Engineer/Inspector, IAQ Program Cory Holmes, Environmental Analyst/Inspector, IAQ Program
Building Description:	These offices are located on the 4-8th floor of the Saltonstall Building, a 1960s era high-rise building in downtown Boston.
Building Population:	Approximately 300 employees on 4 floors
Windows:	Not openable

Methods

Please refer to the IAQ Manual for methods, sampling procedures, and interpretation of results (MDPH, 2015).

IAQ Testing Results

The following is a summary of indoor air testing results (Table 1).

- ***Carbon dioxide levels*** were below 800 parts per million (ppm) in all but two areas assessed, indicating adequate fresh air in the space.
- ***Temperature*** was within the recommended range of 70°F to 78°F in all areas assessed.
- ***Relative humidity*** was below the recommended range of 40% to 60% in all areas assessed.
- ***Carbon monoxide*** levels were non-detectable in all indoor areas assessed.

- ***Fine particulate matter (PM2.5)*** concentrations measured were below the National Ambient Air Quality Standard (NAAQS) level of 35 $\mu g/m^3$ in all areas assessed.

Ventilation

A heating, ventilating, and air conditioning (HVAC) system has several functions. First, it provides heating and, if equipped, cooling. Second, it is a source of fresh air. Finally, an HVAC system will dilute and remove normally occurring indoor environmental pollutants by not only introducing fresh air, but also filtering the airstream and ejecting stale air to the outdoors via exhaust ventilation. Even if an HVAC system is operating as designed, point sources of respiratory irritation may exist and affect symptoms in sensitive individuals. The following analysis examines and identifies components of the HVAC system and likely sources of respiratory irritant/allergen exposure due to water damage, aerosolized dust, and/or chemicals found in the indoor environment.

Fresh air is provided by air handling units (AHUs). Air from the AHUs is filtered, heated/cooled, and delivered to rooms via ducted supply vents (Picture 1). Air is returned/exhausted through vents located around lights (Picture 2). In a few areas, vents were covered by paper, most likely to reduce drafts from the airstreams upon occupants (Picture 3). In order to operate properly, supply and exhaust vents should be unobstructed. It is recommended that HVAC systems be re-balanced every five years to ensure adequate air systems function (SMACNA, 1994).

Along one side of the building, sunlight could be seen streaming in through the windows. Adjustable blinds should be used to control solar gain and assist with temperature control and reducing glare.

Microbial/Moisture Concerns

Plants were observed in office areas (Table 1; Picture 4). Plants can be a source of pollen and mold, which can be respiratory irritants to some individuals. Plants should be properly maintained and equipped with drip pans to prevent water damage to porous materials. Plants should also be located away from air diffusers to prevent the aerosolization of dirt, pollen, and mold.

Small refrigerators and water dispensers were observed in carpeted areas (Table 1; Picture 5). These appliances may spill or leak and lead to carpet damage and microbial growth. It is recommended that these appliances be located in areas without carpeting or on waterproof mats. Carpet squares could also be replaced with tile in areas where water dispensers and refrigerators are located. Some of the refrigerators were crowded with items, had an odor of spoiled food or had evidence of spills (Picture 6). Refrigerators should be kept clean to prevent odors and microbial growth.

Other IAQ Evaluations

Exposure to low levels of total volatile organic compounds (TVOCs) may produce eye, nose, throat, and/or respiratory irritation in some sensitive individuals. To determine if VOCs were present, BEH/IAQ staff examined rooms for products containing VOCs. BEH/IAQ staff noted hand sanitizers, cleaners, air freshener products, and dry erase materials in use within the building (Pictures 7 and 8; Table 1). All of these products have the potential to be irritants to the eyes, nose, throat, and respiratory system of sensitive individuals.

Cooking equipment, including toasters, microwave ovens and coffee machines were located in various parts of the office space. The kitchens on each floor are not enclosed and do not have any direct-vented exhaust, which increases the chance of food odors permeating office areas. For example, the odor of toast was observed in office areas on the 7th floor. Food areas and cooking equipment need to be kept clean to prevent odors and pests.

The offices were mostly carpeted. Carpets should be cleaned annually (or semi-annually in soiled/high traffic areas) in accordance with Institute of Inspection, Cleaning and Restoration Certification (IICRC) recommendations, (IICRC, 2012).

In some areas, stored materials and accumulated items make it more difficult for custodial staff to clean. Items should be stored neatly and moved periodically to allow for wet wiping and vacuuming of surfaces.

Personal fans were observed in a number of areas. Fan blades to some of these units had settled dust, which can be reaerosolized when the fan is activated. Some supply vents were also dusty (Picture 1).

Conclusions/Recommendations

Based on observations at the time of assessment, the following is recommended:

1. Operate supply and exhaust ventilation in all areas during occupied periods.
2. Unblock vents that are covered by paper. To improve comfort, redirect airflow away from occupants if feasible or reconfigure workspace/move building occupant to reduce discomfort due to airflow.
3. Have the HVAC system balanced every 5 years in accordance with SMACNA recommendations (SMACNA, 1994).
4. Use blinds to reduce solar heating and glare.
5. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).
6. Keep indoor plants in good condition, avoid overwatering, and avoid placing them on porous items such as carpets or paper. Also, keep plants out of the air stream of supply vents.
7. Consider locating refrigerators and water dispensers in non-carpeted areas or place on a waterproof mat.
8. Clean refrigerator spills promptly and clean refrigerators out regularly to avoid odors and microbial growth.
9. Reduce use of products containing VOCs including eliminating air freshening products.
10. Ensure cooking areas/equipment are kept clean to prevent odors and pests. Consider reducing the number of areas where food is stored and locating them away from occupied areas.
11. Change filters on AHUs on a regular schedule at least twice a year.
12. Clean carpeting in accordance with IICRC recommendations (IICRC, 2012).
13. Reduce accumulated materials on flat surfaces and store in an organized manner to allow for thorough cleaning.

14. Clean the blades of personal fans, supply, and exhaust vents periodically to avoid aerosolizing dusts.
15. Refer to resource manual and other related IAQ documents located on the MDPH's website for further building-wide evaluations and advice on maintaining public buildings. These documents are available at: http://mass.gov/dph/iaq.

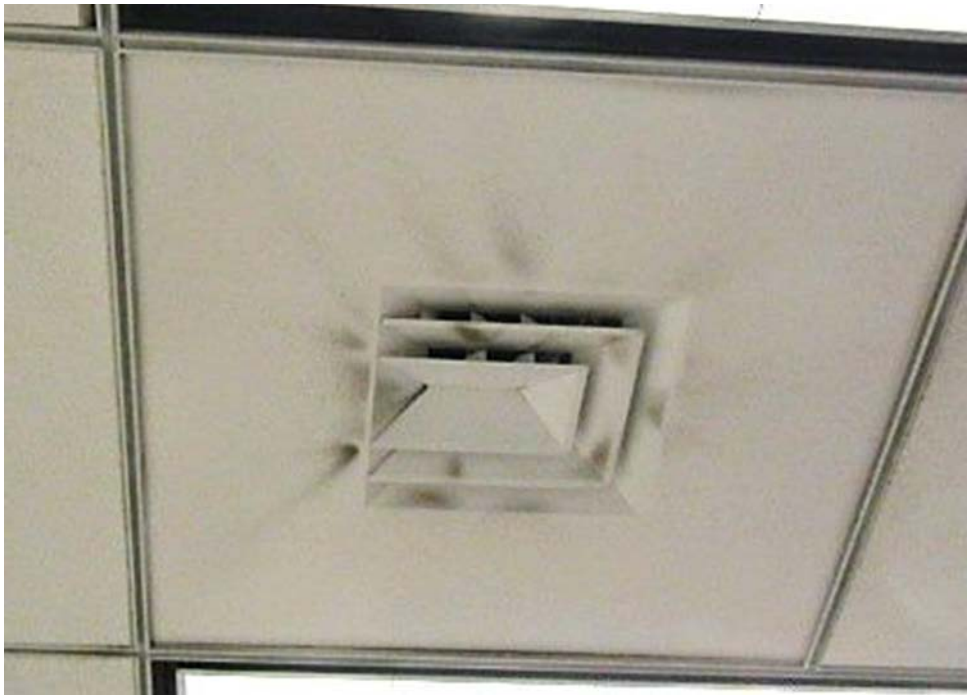
References

IICRC. 2012. Institute of Inspection, Cleaning and Restoration Certification. Carpet Cleaning: FAQ. Retrieved from http://www.iicrc.org/consumers/care/carpet-cleaning.

MDPH. 2015. Massachusetts Department of Public Health. Indoor Air Quality Manual: Chapters I-III. Available at: http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/.

SMACNA. 1994. HVAC Systems Commissioning Manual. 1st ed. Sheet Metal and Air Conditioning Contractors' National Association, Inc., Chantilly, VA.

Picture 1

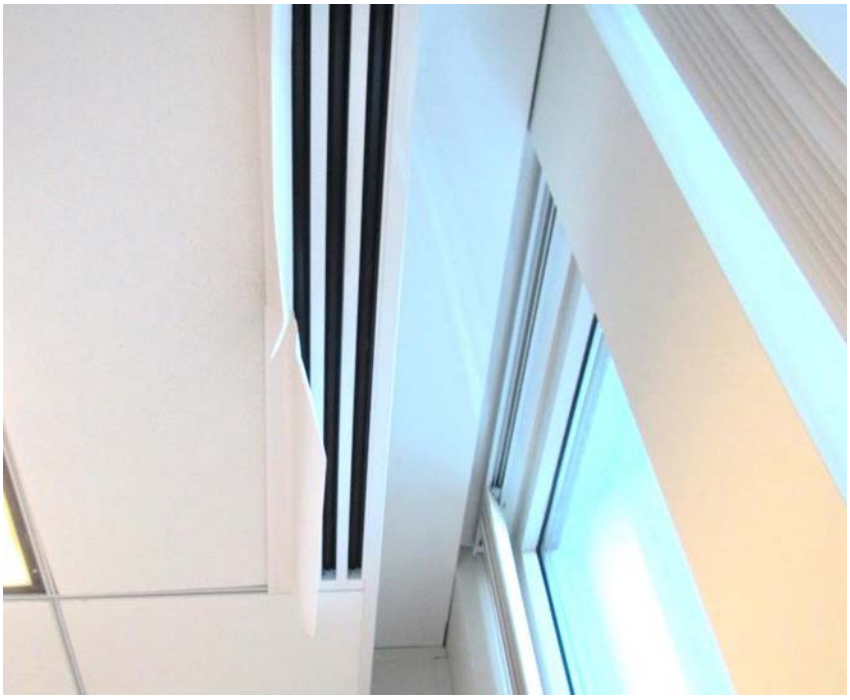


Supply vent, note dust/debris

Picture 2

Light fixture with exhaust vents around it

Picture 3



Paper obstructing supply vent

Picture 4

Plants in an office, in need of maintenance; also note food

Picture 5

Water dispenser on carpet

Picture 6

Refrigerator with evidence of spills and stained gasket

Picture 7

Cleaning products

Picture 8

Reed diffuser

Location: Department of Revenue **Indoor Air Results**

Address: 100 Cambridge Street, Boston, MA **Date: 1/11/2017**

Table 1

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Background	360	1.0	58	26	10					Mostly sunny
Mezzanine										
Mailroom	532	ND	73	27	4	1	N	Y	Y	CPs, DEM
5^{th} floor										
1-5 cubes	674	ND	73	24		1	N	Y	Y	
6-10 cubes	654	ND	74	24	3	4	N	Y	Y	PF
14-17 cubes	657	ND	74	24	3	3	N	Y	Y	
26-29 cubes	653	ND	74	24	3	1	N	Y	Y	
32-33 cubes	626	ND	74	24	3	0	N	Y	Y	
36-38 cubes	641	ND	74	32	3	1	N	Y	Y	PF

ppm = parts per million
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ND = non detect
AF = air freshener
AI – accumulated items
AP = air purifier
CP = cleaning products
DEM = dry erase materials
DO = door open
HS = hand sanitizer
PC = photocopier
PF = personal fan
WC = water cooler

Comfort Guidelines

Carbon Dioxide: < 800 ppm = preferred
> 800 ppm = indicative of ventilation problems

Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%

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Indoor Air Results

Date: 1/11/2017

Table 1(continued)

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
39-40 cubes	675	ND	75	23	4	1	N	Y	Y	
45-46A cubes	631	ND	74	23	3	2	N	Y	Y	PF
47-48 cubes	650	ND	74	24	3	2	N	Y	Y	PF
50-52 cubes	638	ND	74	24	4	3	N	Y	Y	
53-57 cubes	653	ND	74	24	4	1	N	Y	Y	
67-73 cubes	704	ND	74	24	4	0	N	Y	Y	
77-81 cubes	711	ND	74	24	4	3	N	Y	Y	
85-89 cubes	651	ND	74	24	4	5	N	Y	Y	PF
100-101 cubes	664	ND	73	24	4	2	N	Y	Y	
103-105 cubes	704	ND	74	24	4	3	N	Y	Y	

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								Supply	Exhaust	
117-119 cubes	675	ND	74	24	4	0	N	Y	Y	
5-01K	634	ND	74	24	3	1	N	Y	Y	DEM
5-05M	614	ND	74	23	4	0	N	Y	Y	DEM, PF
5-06A	666	ND	73	24	4	0	N	Y	Y	
5-09B	669	ND	74	24	4	1	N	Y	Y	Dusty vents
5-14A	706	ND	74	25	4	1	N	Y	Y	DEM
5-16M	668	ND	74	25	5	1	N	Y	Y	
5-19M	660	ND	74	24	4	1	N	Y	Y	
5-22M	653	ND	74	24	4	0	N	Y	Y	
5-23B	677	ND	74	24	4	1	N	Y	Y	Dusty vents

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								Supply	Exhaust	
6th floor										
2-4 cubes	694	ND	72	28	1	0	N	Y	Y	
5-8 cubes	681	ND	73	25	1	2	N	Y	Y	
12-18 cubes	750	ND	75	25	2	4	N	Y	Y	PF - dusty
25-29	701	ND	75	24	2	5	N	Y	Y	
30-33 cubes	676	ND	75	24	2	4	N	Y	Y	
36-37 cubes	666	ND	74	24	2	1	N	Y	Y	
42-43 cubes	688	ND	75	23	3	2	N	Y	Y	PF
44-46 cubes	668	ND	75	23	3	1	N	Y	Y	
48-51 cubes	677	ND	75	23	3	3	N	Y	Y	

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								Supply	Exhaust	
56-59 cubes	675	ND	74	24	3	0	N	Y	Y	PF
70-73 cubes	640	ND	74	24	3	1	N	Y	Y	
78-83 cubes	664	ND	74	24	3	3	N	Y	Y	
85 cube	658	ND	74	24	3	1	N	Y	Y	
88-91 cubes	664	ND	74	24	3	1	N	Y	Y	PF
97-99 cubes	698	ND	74	24	4	2	N	Y	Y	Dusty vents
6-01A	698	ND	74	26	1	1	N	Y	Y	
6-01G	671	ND	75	24	2	0	N	Y	Y	
6-01H	651	ND	74	23	2	0	N	Y	Y	DEM
6-01J	672	ND	74	25	2	0	N	Y	Y	PF (dusty), plant, mini humidifier

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								Supply	Exhaust	
6-01M	705	ND	74	24	2	0	N	Y	Y	
6-03A	700	ND	73	27	2	1	N	Y	Y	PF
6-04A	699	ND	72	27	2	0	N	Y	Y	
6-04G	672	ND	74	24	2	2	N	Y	Y	PC, PF
6-06M	662	ND	75	23	3	1	N	Y	Y	PF
6-10M	679	ND	75	23	3	1	N	Y	Y	PF
6-11A	714	ND	74	24	3	4	N	Y	Y	
6-16J	699	ND	75	23	2	0	N	Y	Y	DEM, dusty vents
6-17A conference room	728	ND	74	24	4	0	N	Y	Y	PC, PF
6-19E	706	ND	74	25	3	1	N	Y	Y	

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								Supply	Exhaust	
6-19J conference room	664	ND	74	23	3	0	N	Y	Y	DEM
6-22M	677	ND	74	24	3	1	N	Y	Y	DEM, plants
6-23C	671	ND	74	24	3	0	N	Y	Y	
6-24N	678	ND	74	25	3	2	N	Y	Y	
Lumb office	673	ND	74	25	4	1	N	Y	Y	
Reception	728	ND	70	30	3	0	N	Y	Y	
7^{th} floor										
2-3 cubes	729	ND	73	25	5	0	N	Y	Y	DEM
4-5 cubes	718	ND	74	25	5	1	N	Y	Y	DEM, AI
8 cubes	711	ND	74	24	4	1	N	Y	Y	

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								Supply	Exhaust	
11-14 cubes	734	ND	75	25	6	3	N	Y	Y	Plants
19-21 cubes	729	ND	75	25	5	0	N	Y	Y	Fridge and toaster
22 cubes	712	ND	74	25	4	0	N	Y	Y	Fridge on carpet, toaster
25, 33 cubes	716	ND	75	24	4	0	N	Y	Y	
26-29 cubes	712	ND	75	24	5	2	N	Y	Y	CP
34-36 cubes	728	ND	75	24	5	1	N	Y	Y	Coffee
41-43 cubes	726	ND	74	24	4	0	N	Y	Y	
45-48 cubes	700	ND	74	24	5	3	N	Y	Y	
51-52 cubes	718	ND	74	24	4	0	N	Y	Y	PF, CP, food
53-54 cubes	704	ND	73	25	4	2	N	Y	Y	

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								Supply	Exhaust	
55-57 cubes	719	ND	73	25	5	2	N	Y	Y	PFs, CP, food
7-01G	721	ND	75	24	4	0	N	Y	Y	Plant
7-01M conference room	694	ND	73	24	5	0	N	Y	Y	DEM
7-02A	730	ND	74	25	4	0	N	Y	Y	DO, DEM, HS
7-03A	752	ND	74	25	4	1	N	Y	Y	
7-04A	681	ND	74	25	4	1	N	Y	Y	
7-05	660	ND	74	25	5	0	N	Y	Y	DEM, DO
7-05M	714	ND	74	25	4	1	N	Y	Y	Boxes
7-06M	753	ND	74	25	5	1	N	Y	Y	Solar gain, PF, plants
7-08M	719	ND	73	28	3	0	N	Y	Y	

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								Supply	Exhaust	
7-09A	776	ND	74	25	5	1	N	Y	Y	DEM, DO, AI
7-09B	741	ND	74	24	5	0	N	Y	Y	AI
7-09J	735	ND	73	26	3	0	N	Y	Y	HS
7-09M	681	ND	74	25	3	0	N	Y	Y	Food
7-10A	710	ND	74	25	4	0	N	Y	Y	
7-10B	751	ND	74	25	5	1	N	Y	Y	Vent dusty, PF, DO
7-10H	729	ND	74	25	6	0	N	Y	Y	Plant
7-10J	742	ND	74	25	3	0	N	Y	Y	Food, reed AF
7-10M	718	ND	74	26	4	1	N	Y	Y	Dried flowers
7-11A	744	ND	73	25	4	0	N	Y	Y	PF, boxes

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								Supply	Exhaust	
7-11J	695	ND	74	24	3	0	N	Y	Y	
7-11M	665	ND	74	24	4	0	N	Y	Y	DO, PF
7-12A	710	ND	73	25	4	0	N	Y	Y	DO, CP, DEM
7-12B	731	ND	73	24	6	1	N	Y	Y	DO, PF
7-12J	687	ND	75	24	4	0	N	Y	Y	Plants (need water), food
7-12M	677	ND	75	24	4	1	N	Y	Y	DO, PF
7-12M	706	ND	74	24	5	1	N	Y	Y	
7-13A	733	ND	73	25	5	2	N	Y	Y	Items
7-13B	717	ND	73	25	5	0	N	Y	Y	Food, PF
7-13M	629	ND	75	24	7	2	N	Y	Y	HS

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Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
7-14A	725	ND	73	25	5	2	N	Y	Y	Vent blocked, food odors
7-14M	702	ND	76	24	4	0	N	Y	Y	Vent partly covered
7-15A	705	ND	73	25	4	0	N	Y	Y	DO, DEM, dried flowers
7-15M	658	ND	76	23	4	0	N	Y	Y	PF, DO
7-16M	689	ND	77	23	5	0	N	Y	Y	
7-17A	678	ND	73	24	4	0	N	Y	Y	Boxes on floor
7-17A	744	ND	73	25	4	0	N	Y	Y	PF, coffee
7-17J kitchen	698	ND	76	23	6	0	N	Y	Y	No local exhaust, toast odor, fridge with spills, microwave and toaster
7-17M	671	ND	76	23	4	1	N	Y	Y	Items, area rug, AI
7-18M	738	ND	76	23	4	0	N	Y	Y	AI, books

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Comfort Guidelines

Carbon Dioxide: < 800 ppm = preferred
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Temperature: 70 - 78 °F
Relative Humidity: 40 - 60%

Location: Department of Revenue **Indoor Air Results**

Address: 100 Cambridge Street, Boston, MA **Date: 1/11/2017**

Table 1(continued)

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
7-19A	742	ND	73	25	5	1	N	Y	Y	DO, AI, DEM
7-19H	664	ND	74	24	4	0	N	Y	Y	Dusty vent, AP
7-19J	840	ND	75	23	5	0	n	y	Y	
7-19M	799	ND	75	23	4	1	N	Y	Y	CP, DO
7-20A	695	ND	73	25	5	1	N	Y	Y	
7-20J	705	ND	75	23	4	1	N	Y	Y	DO
7-20M	697	ND	75	23	4	1	N	Y	Y	AI and books and papers, DO
7-21M	679	ND	75	23	4	1	N	Y	Y	PF, plant, DO
7-22M	687	ND	75	23	4	1	N	Y	Y	DO
7-23B	643	ND	74	24	4	0	N	Y	Y	HS, DEM

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Table 1(continued)

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
7-23C	648	ND	74	24	4	0	N	Y	Y	
7-23D	697	ND	74	25	4	0	N	Y	Y	CP/AF, boxes on floor
7-23E	674	ND	74	24	4	1	N	Y	Y	Boxes
7-23F	678	ND	74	24	4	0	N	Y	Y	Dusty PF
7-23H	670	ND	74	24	5	2	N	Y	Y	Plants
7-23J	690	ND	74	24	4	1	N	Y	Y	PF, DEM, DO
7-23M	659	ND	74	23	4	0	N	Y	Y	
7^{th} floor IT room	931	ND	74	25	4	0	N	Y		
Copy area	644	ND	74	24	4	0	N	Y	Y	PC, fridge on carpet
Copy area	685	ND	73	25	4	0	N	Y	Y	WC on carpet

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Table 1(continued)

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
Large copier	660	ND	73	25	5	0	N	Y	Y	
Reception	735	ND	73	24	5	0	N	Y	Y	
8^{th} floor										
1-2 cubes	669	ND	73	25	5	1	N	Y	Y	
1-6 cubes	741	ND	74	25	5	0	N	Y	Y	
7-8 cubes	730	ND	73	25	5	2	N	Y	Y	
9-11 cubes	705	ND	74	24	5	2	N	Y	Y	
12-19 cubes	699	ND	75	24	4	0	N	Y	Y	Solar gain
20-22 cubes	651	ND	75	23	4	0	N	Y	Y	Solar gain
24-22 cubes	652	ND	75	24	5	2	N	Y	Y	Plants, solar gain

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Location: Department of Revenue **Indoor Air Results**

Address: 100 Cambridge Street, Boston, MA **Date: 1/11/2017**

Table 1(continued)

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
27-28 cubes	645	ND	74	24	5	0	N	Y	Y	
29-30 cubes	672	ND	74	24	5	1	N	Y	Y	
33-38 cubes	631	ND	74	24	5	1	N	Y	Y	PF, food, big printer
40-49 cubes	650	ND	74	24	5	3	N	Y	Y	Plants
48 cubes	668	ND	74	24	5	0	N	Y	Y	
50 cubes	650	ND	74	24	5	0	N	Y	Y	
51-52 cubes	668	ND	74	24	7	0	N	Y	Y	
53-54 cubes	673	ND	74	24	5	1	N	Y	Y	
55 cubes	646	ND	74	24	6	0	N	Y	Y	
8-01A	642	ND	73	24	5	0	N	Y	Y	

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Table 1(continued)

Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
8-01B Commissioners conference room	644	ND	73	24	5	0	N	Y	Y	
8-01H	625	ND	74	24	5	1	N	Y	Y	DEM
8-01J	686	ND	74	24	5	1	N	Y	Y	
8-01M	631	ND	73	24	5	0	N	Y	Y	DEM
8-03A	660	ND	74	24	5	2	N	Y	Y	CP
8-05A	738	ND	74	24	5	0	N	Y	Y	Fake plant, DEM, AF, CP
8-05A	669	ND	74	25	5	1	N	Y	Y	Plant
8-05B	686	ND	74	25	6	1	N	Y	Y	
8-05F	673	ND	74	25	5	1	N	Y	Y	
8-05G	665	ND	74	24	5	1	N	Y	Y	DEM

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Table 1(continued)

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								Supply	Exhaust	
8-05H	708	ND	74	25	5	1	N	Y	Y	DEM
8-05J	641	ND	73	25	5	1	N	Y	Y	
8-05M	645	ND	73	25	4	1	N	Y	Y	DEM
8-06B	662	ND	74	24	5	0	N	Y	Y	
8-06M	659	ND	73	25	5	1	N	Y	Y	CP, DEM
8-07A	640	ND	74	25	5	0	N	Y	Y	DEM
8-07M	648	ND	73	25	5	0	N	Y	Y	Plants, solar gain, DEM
8-09A	637	ND	74	25	5	1	N	Y	Y	AF – reeds, flowers
8-09M	651	ND	75	25	5	0	N	Y	Y	Solar gain
8-10B	648	ND	74	26	5	0	N	Y	Y	

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Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
8-11A	678	ND	73	25	3	1	N	Y	Y	
8-11B	641	ND	74	24	5	0	N	Y	Y	
812A	681	ND	74	24	5	1	N	Y	Y	
812B	627	ND	74	24	6	0	N	Y	Y	
8-12J	636	ND	75	23	4	1	N	Y	Y	DEM, perfume odor
8-13J	641	ND	75	24	5	0	N	Y	Y	
815B	627	ND	74	24	5	0	N	Y	Y	
816B	654	ND	74	24	5	1	N	Y	Y	
817B copy	654	ND	74	24	6	0	N	Y	Y	Copy
8-17M	689	ND	74	24	5	1	N	Y	Y	CP

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Location	Carbon Dioxide (ppm)	Carbon Monoxide (ppm)	Temp (°F)	Relative Humidity (%)	PM2.5 ($\mu g/m^3$)	Occupants in Room	Windows Openable	Ventilation		Remarks
								Supply	Exhaust	
8-18A	697	ND	74	25	5	1	N	Y	Y	Area rug
8-18B	676	ND	74	24	6	1	N	Y	Y	AF odor, CP
8-19B conference	627	ND	74	24	7	0	N	Y	Y	DEM
8-19D	652	ND	74	24	5	1	N	Y	Y	DEM
8-19G	635	ND	74	25	7	2	N	Y	Y	
8-19H	662	ND	74	24	5	1	N	Y	Y	DEM
8-19J Conference room	651	ND	74	24	5	0	N	Y	Y	DEM
8-19M	689	ND	74	24	5	2	N	Y	Y	DEM
8-20M	658	ND	74	24	5	1	N	Y	Y	DEM, solar
8-23B	645	ND	74	23	4	0	N	Y	Y	

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								Supply	Exhaust	
8-23D	657	ND	74	24	5	0	N	Y	Y	DEM, PF, papers
8-23M	680	ND	74	24	5	2	N	Y	Y	DEM
Chief of staff	668	ND	73	24	5	1	N	Y	Y	
Kitchen	639	ND	74	23	5	0	N	Y	Y	Fridge has odor, microwave and toaster
Reception	620	ND	74	24	6	0	N	Y	Y	

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